



The effects of Australia's Black Summer fires on estuaries

Thayanne L Barros

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UNSW
AUSTRALIA



Photo @johnwturnbull

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2019-20 Black Summer Fires



5.4 million
hectares of land
in NSW



42% of all
NSW state forest



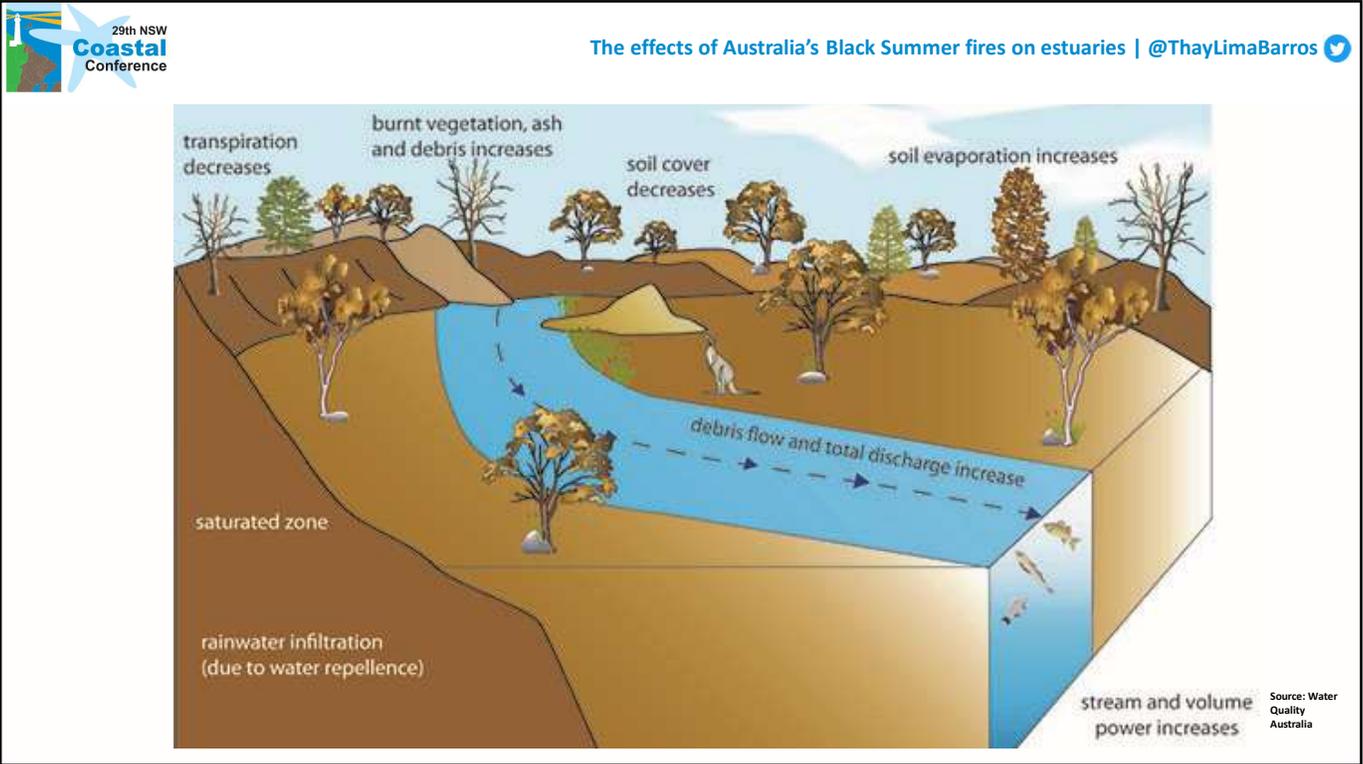
37% of all
NSW national park estate



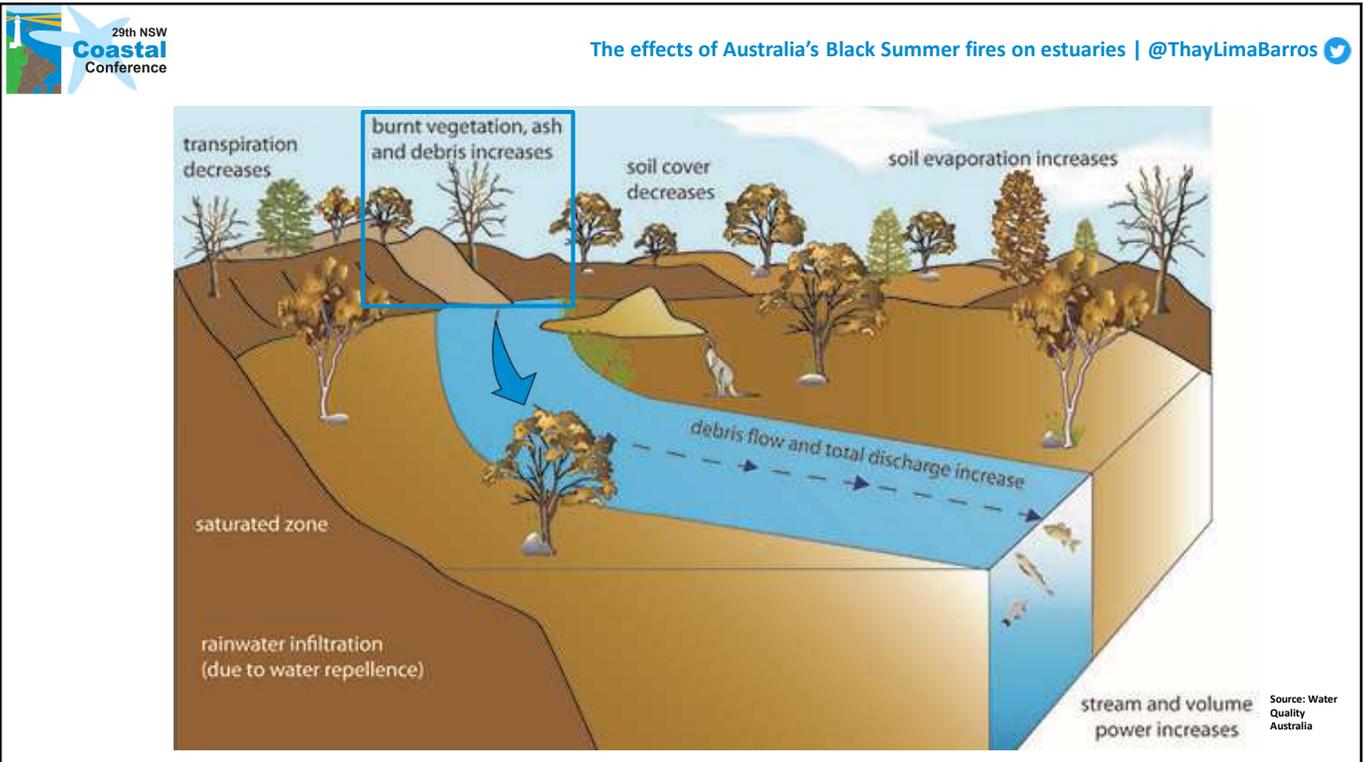
81% of the
Greater Blue Mountains
World Heritage Area

Source: NSW Fire and the Environment
2019-20 Summary

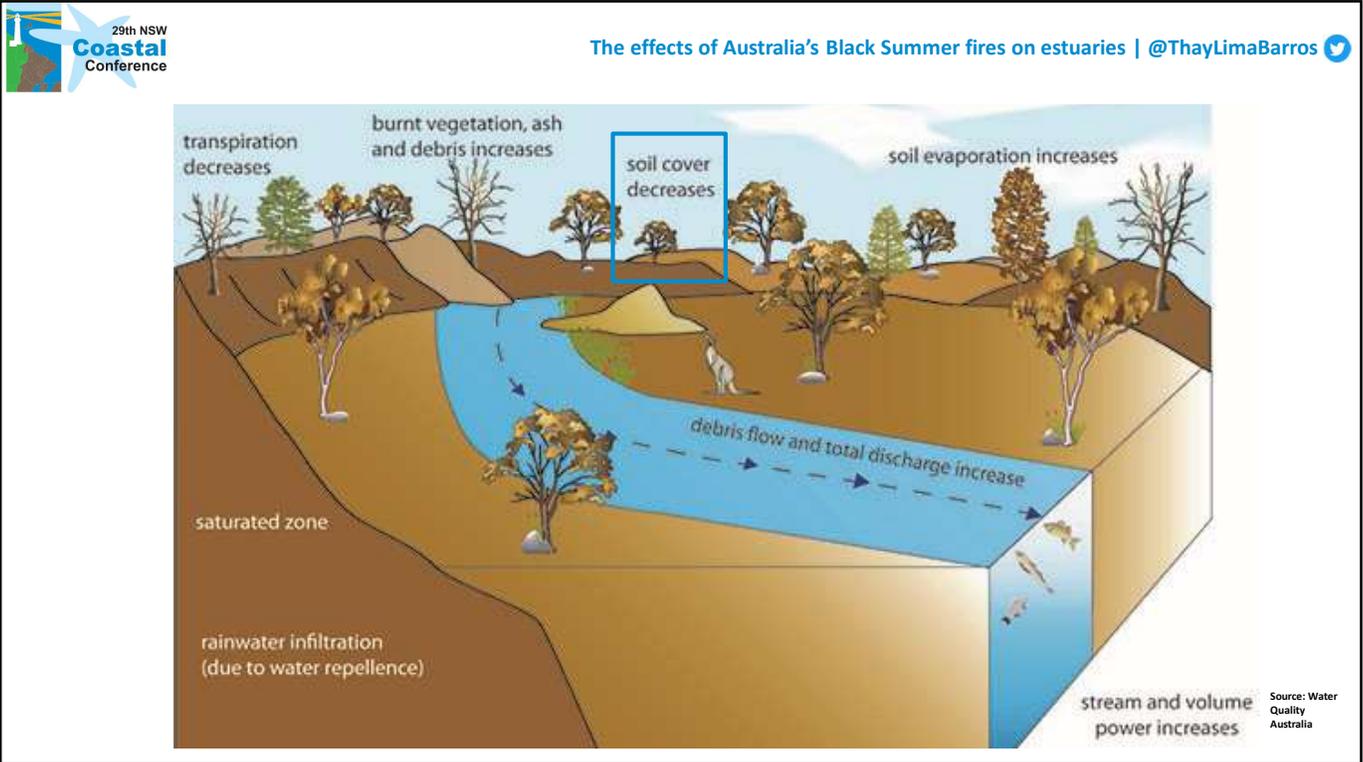
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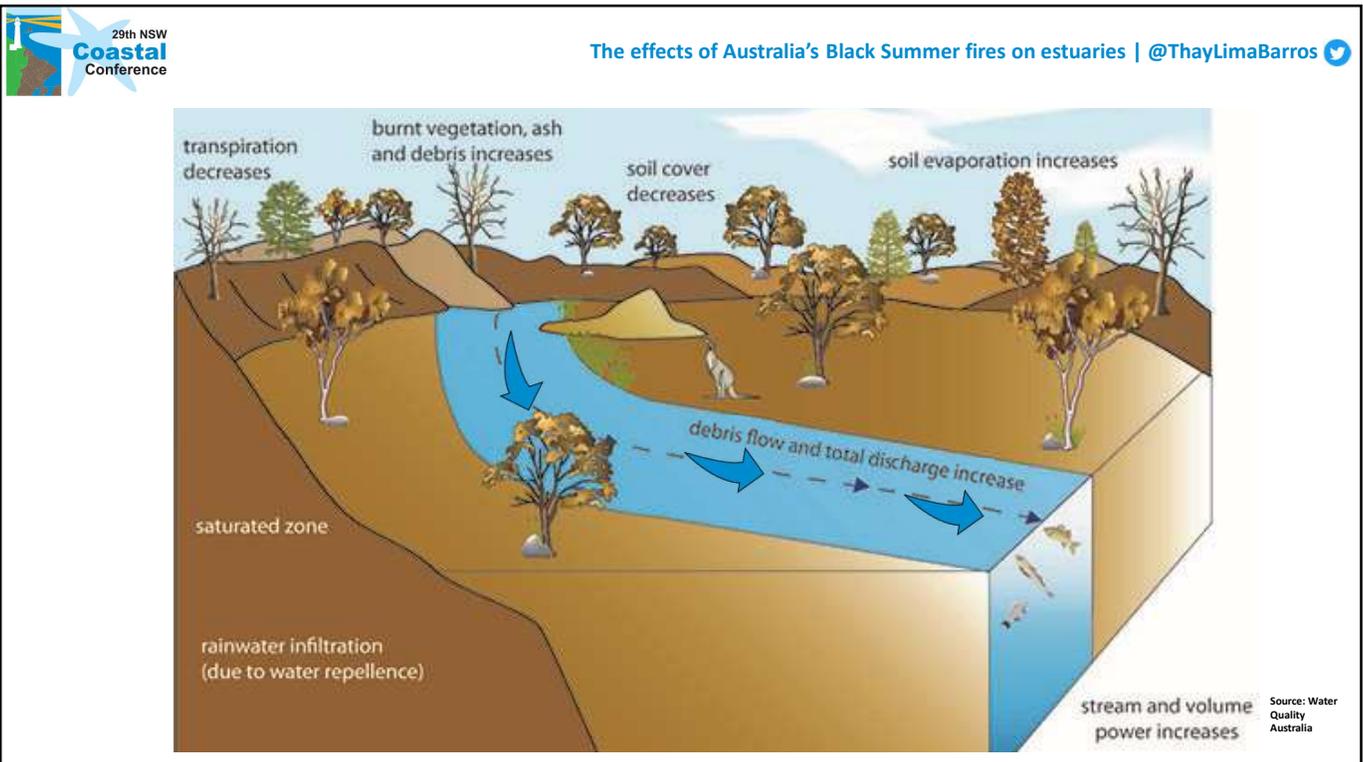
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Knowledge gap



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Knowledge gap



Longer and more intense bushfires



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Knowledge gap



Longer and more intense bushfires



Proximity to coastal areas



Photo @johnwtturnbull



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Knowledge gap



Longer and more intense bushfires



Proximity to coastal areas



Management of coastal habitats



Photo @johnwtturnbull



Photo @johnwturnbull

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Photo @johnwturnbull

Estuarine Sediment Condition

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Estuarine Sediment Condition

How do bushfires affect estuaries with respect to changes in input of inorganic and organic substances in the estuarine sediment?

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Estuarine Sediment Condition

How do bushfires affect estuaries with respect to changes in input of inorganic and organic substances in the estuarine sediment?

- (i) severe fires have impacts that extend beyond terrestrial and freshwater ecosystems into estuarine and marine areas
- (ii) differences in impact can be attributed to the proximity of the fire to the estuary

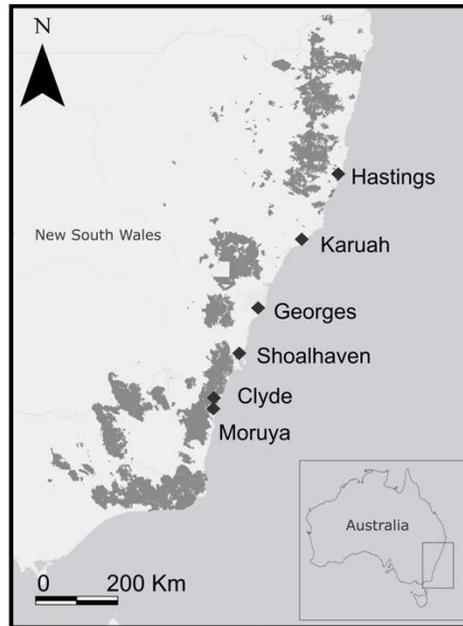
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Photo @johnwturnbull

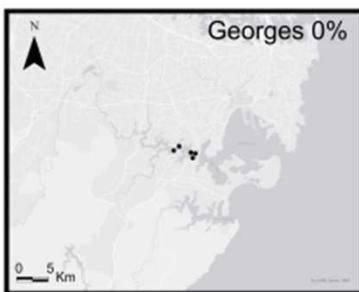


Photo: Brie Sherow



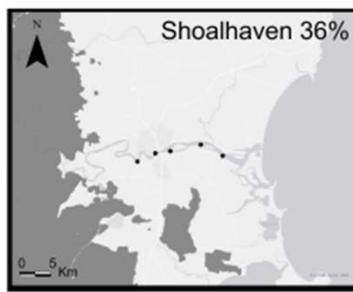
Manuscript under review

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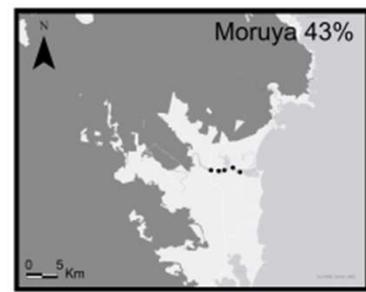


Georges 0%

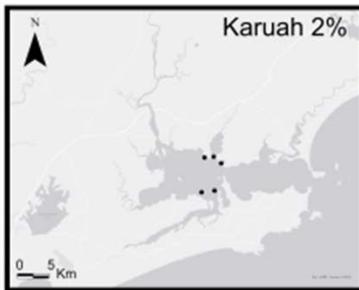
≠ Intensity
≠ Scale
≠ Background stressors



Shoalhaven 36%



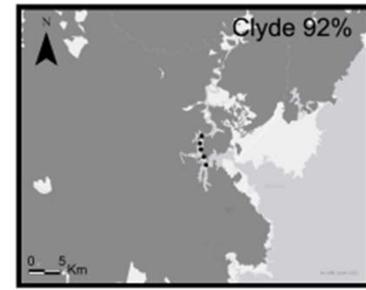
Moruya 43%



Karuah 2%



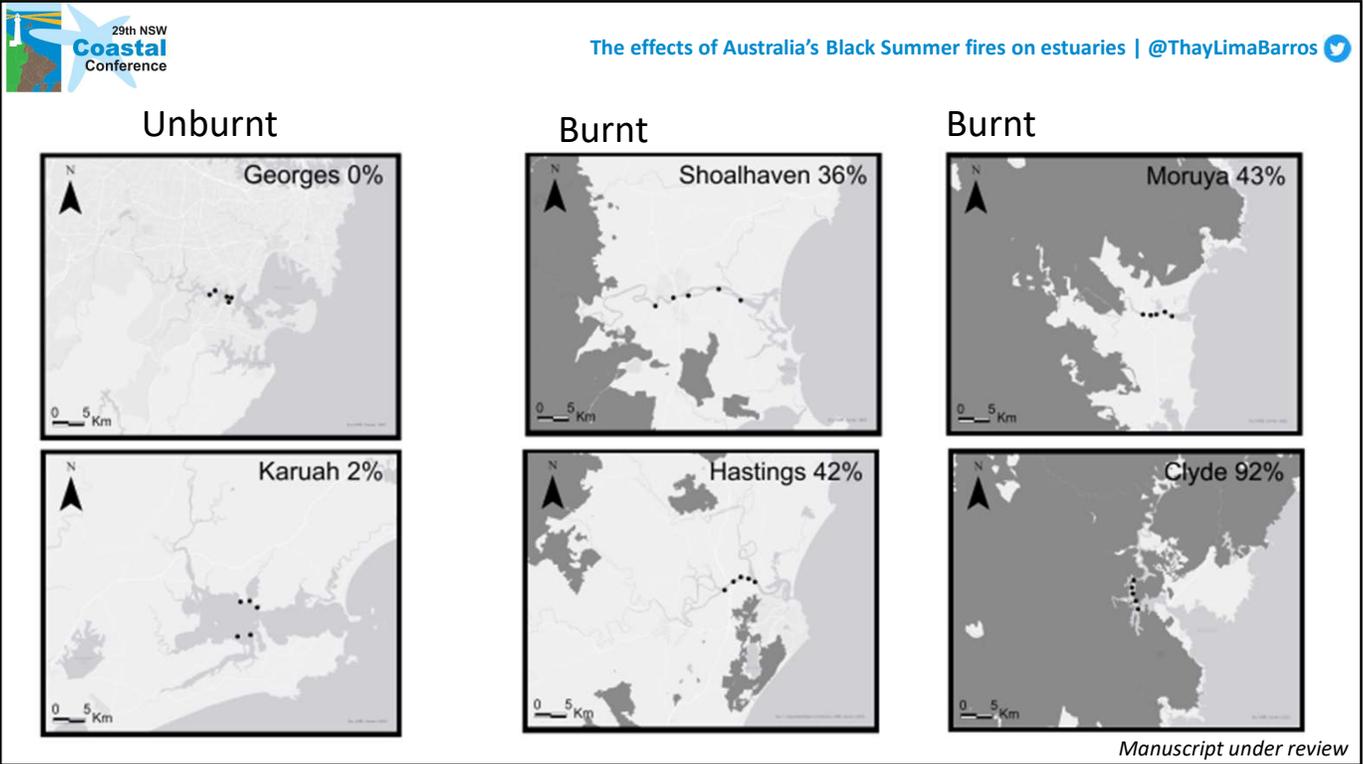
Hastings 42%



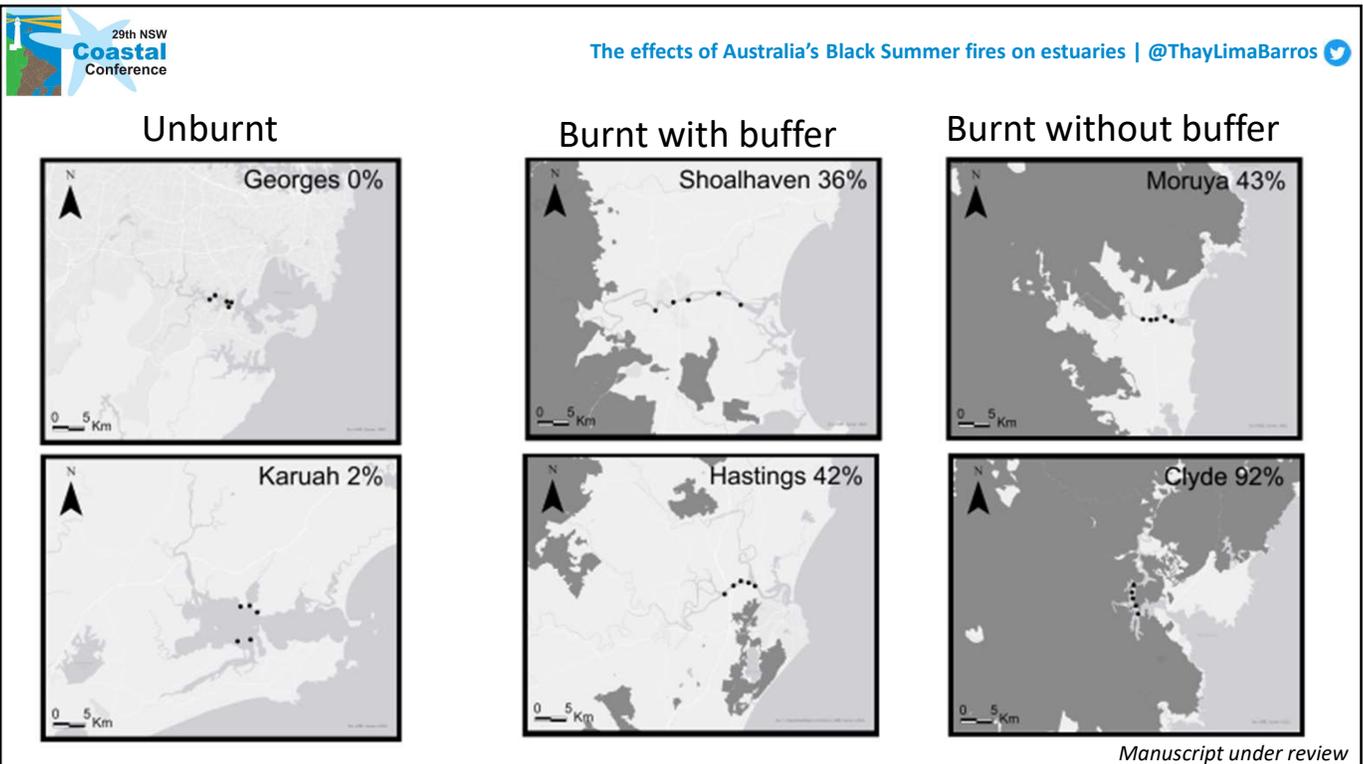
Clyde 92%

Manuscript under review

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Burnt without buffer

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- Pyrogenic Carbon
- Total Nitrogen
- Metals
- Silt Content
- % Total Organic Carbon
- Total Phosphorus



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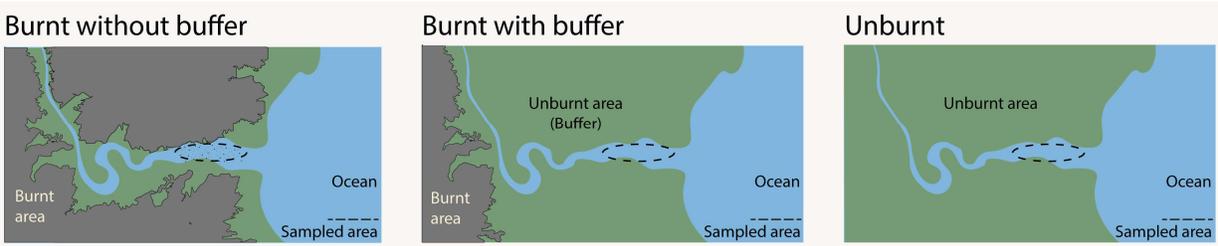


- Pyrogenic Carbon
- Total Nitrogen
- Metals
- Silt Content
- % Total Organic Carbon
- Total Phosphorus

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Changes from before to after fires:

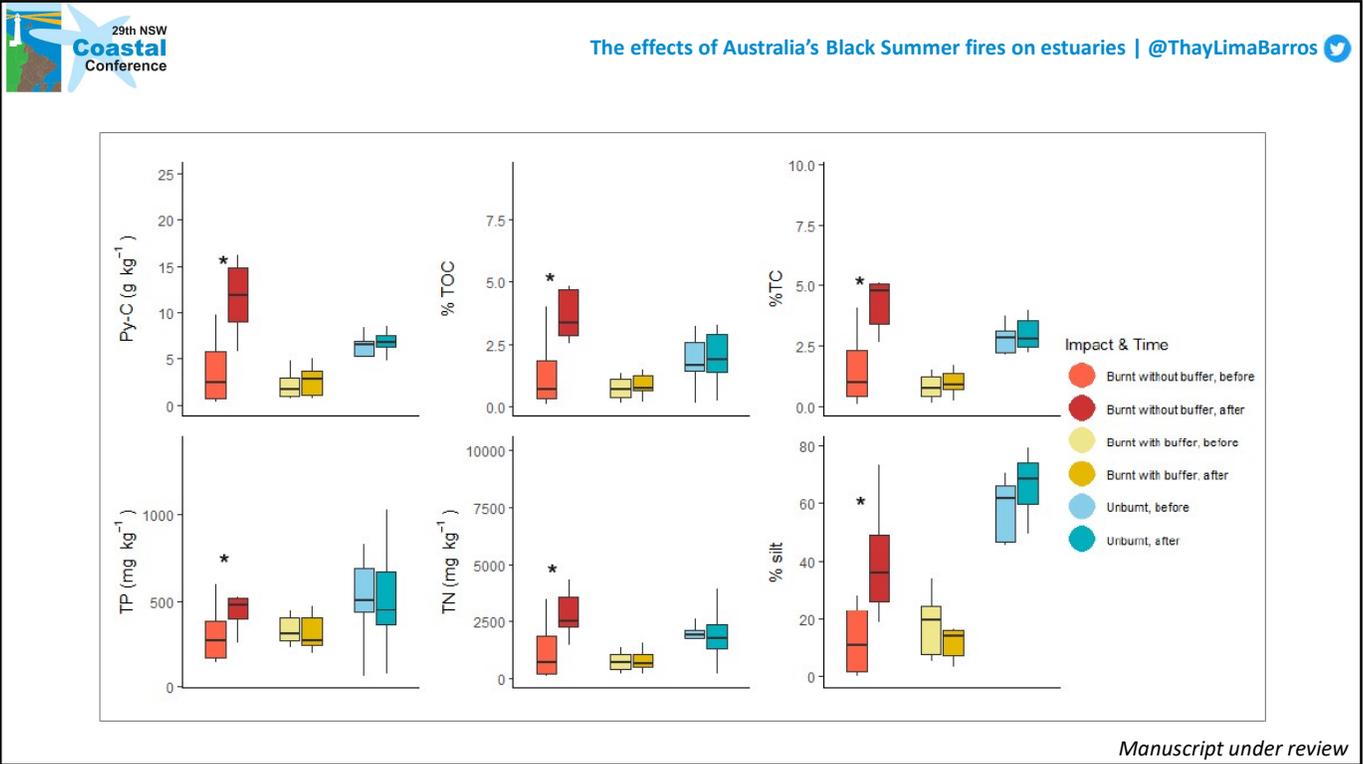
Carbon	↗	Metals	↗
Silt	↗	Nutrients	↗

Carbon	=	Metals	=
Silt	=	Nutrients	=

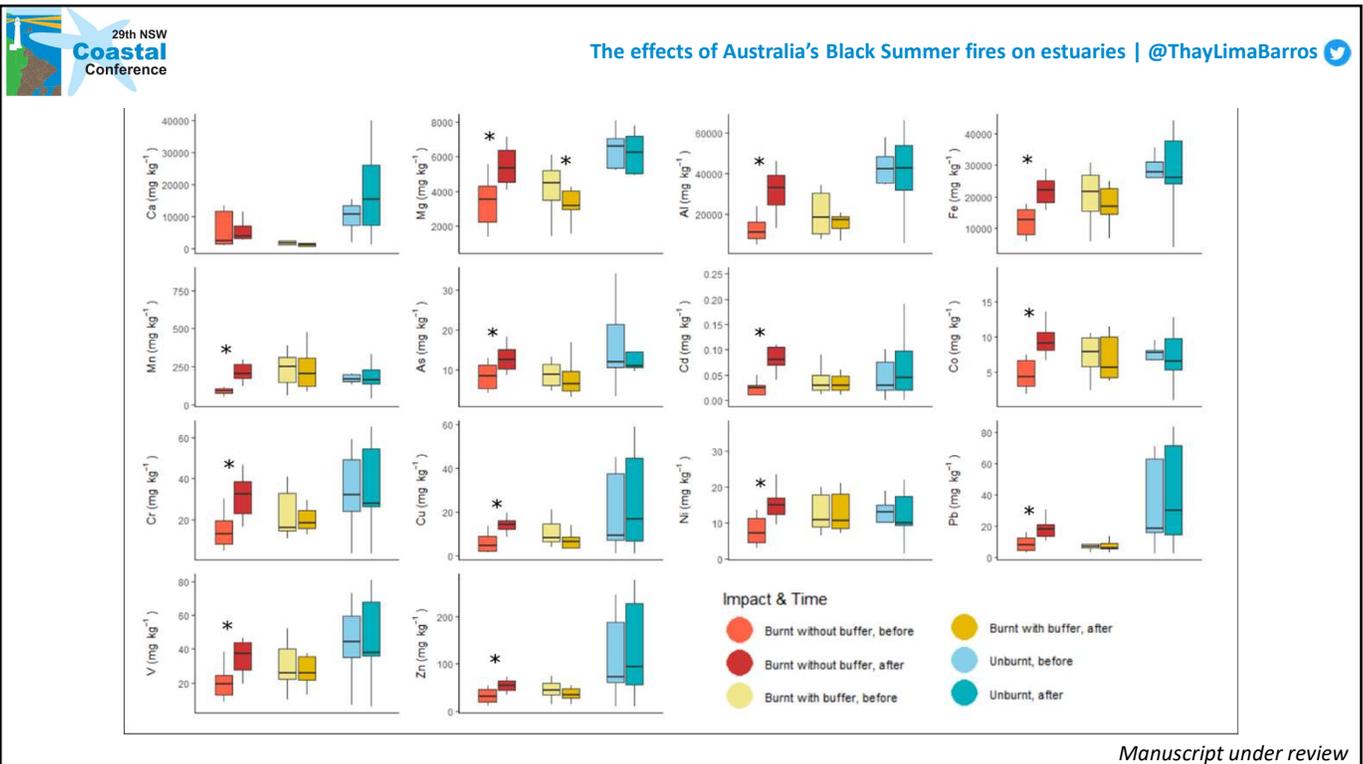
Carbon	=	Metals	=
Silt	=	Nutrients	=

Manuscript under review

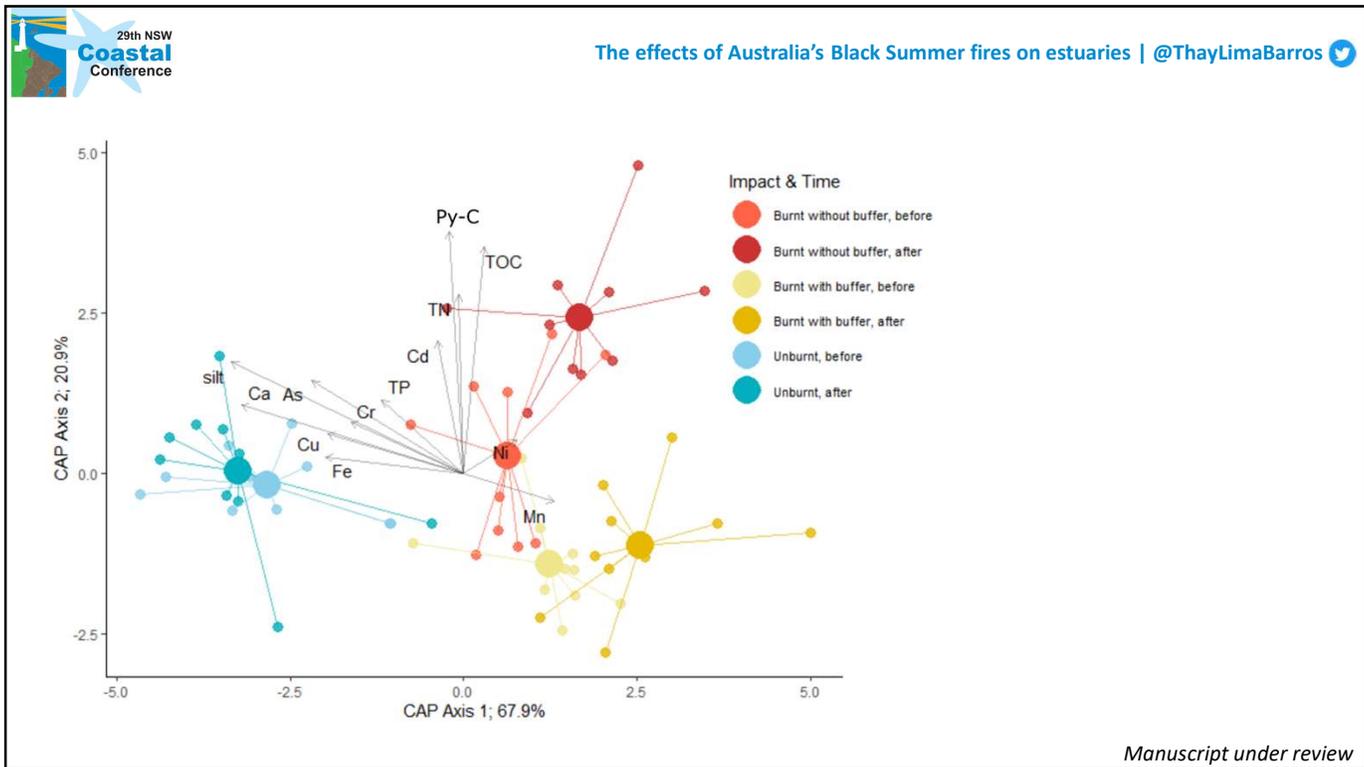
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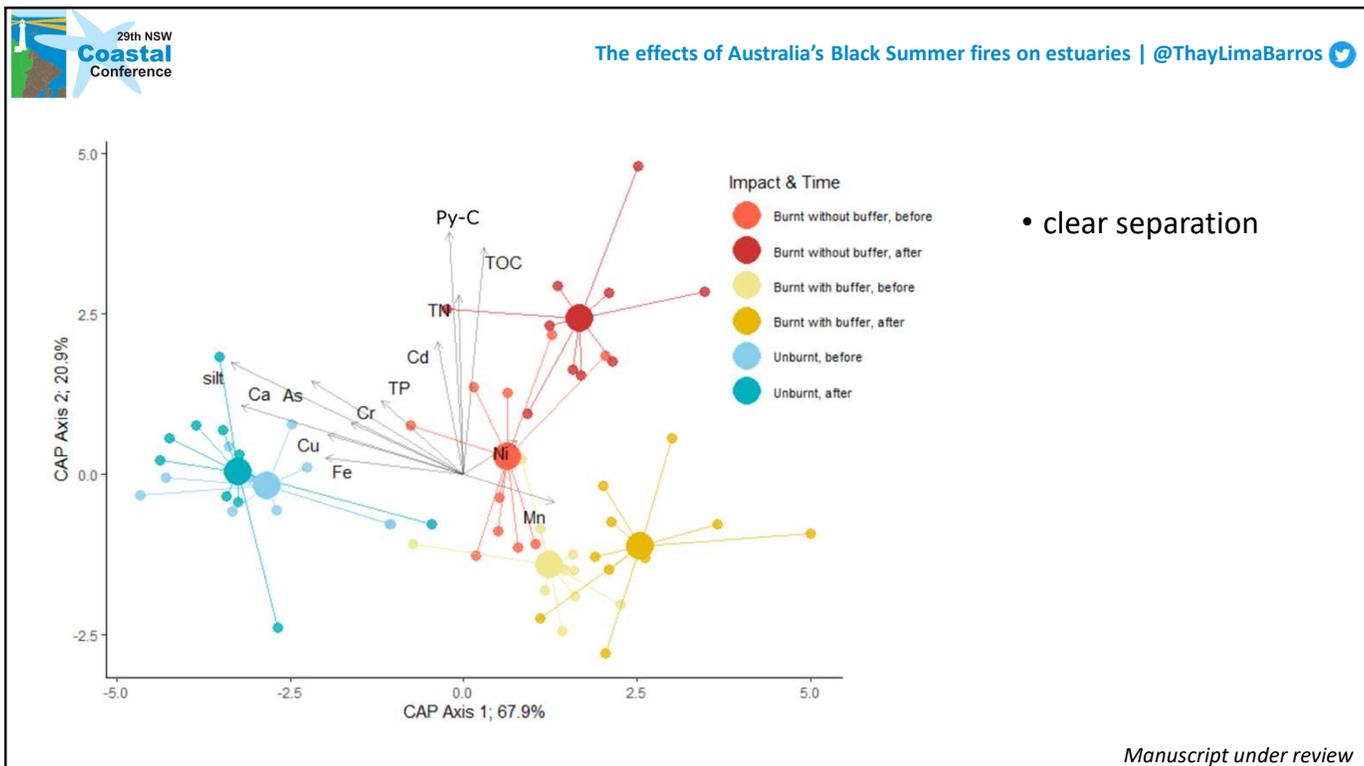
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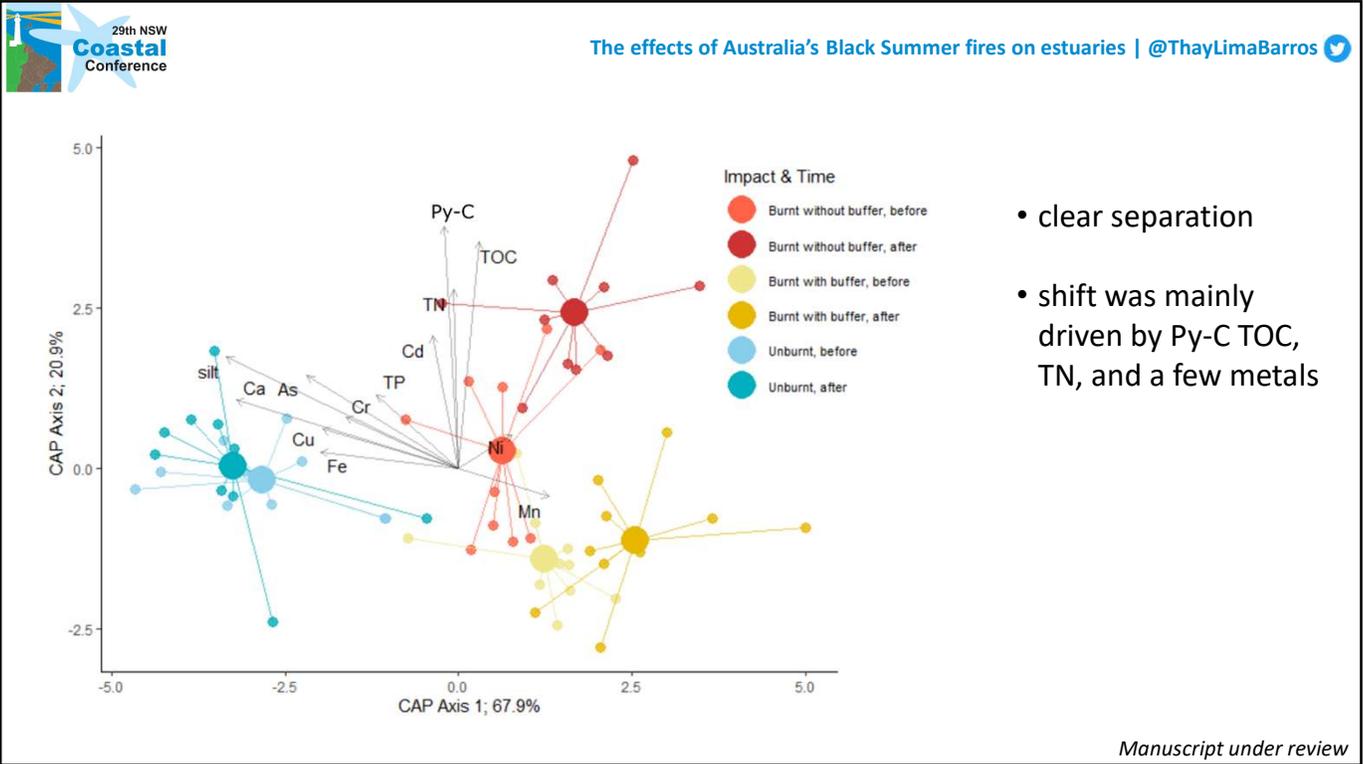
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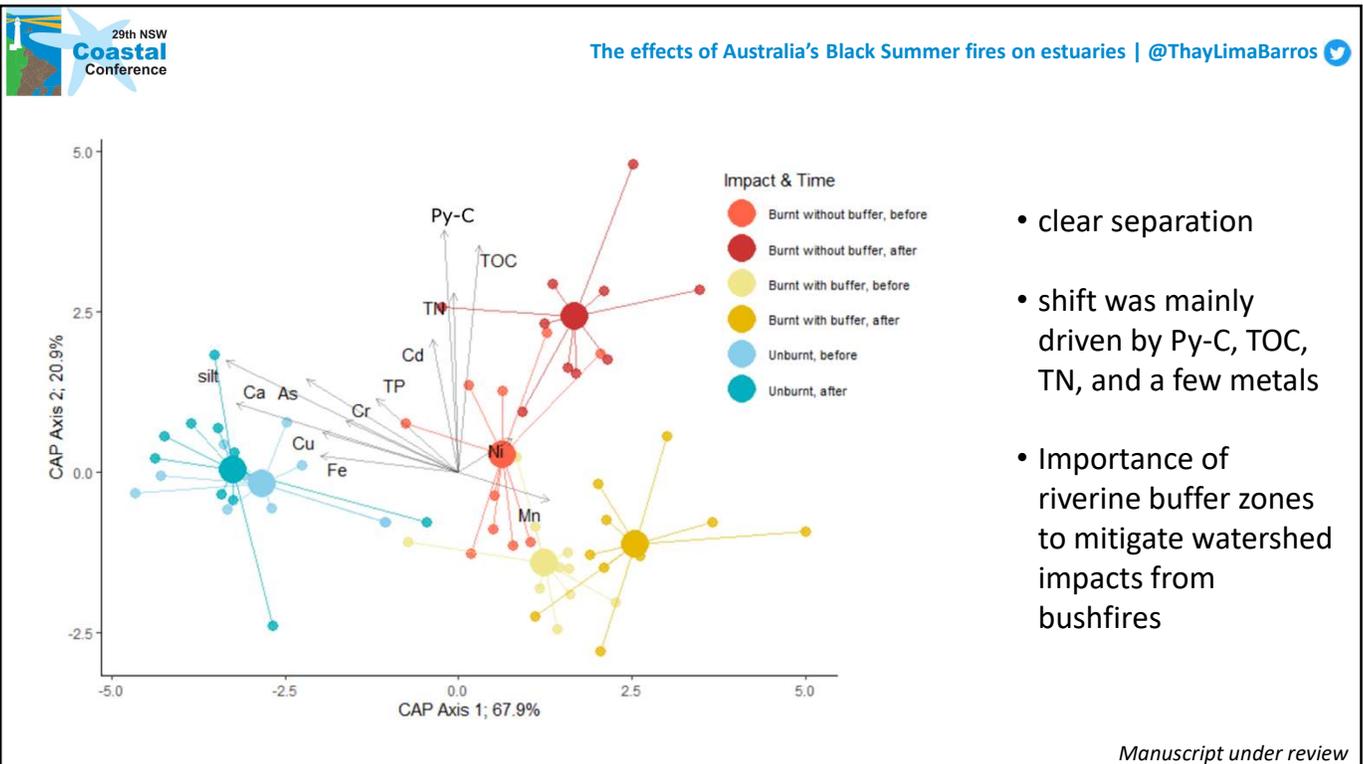


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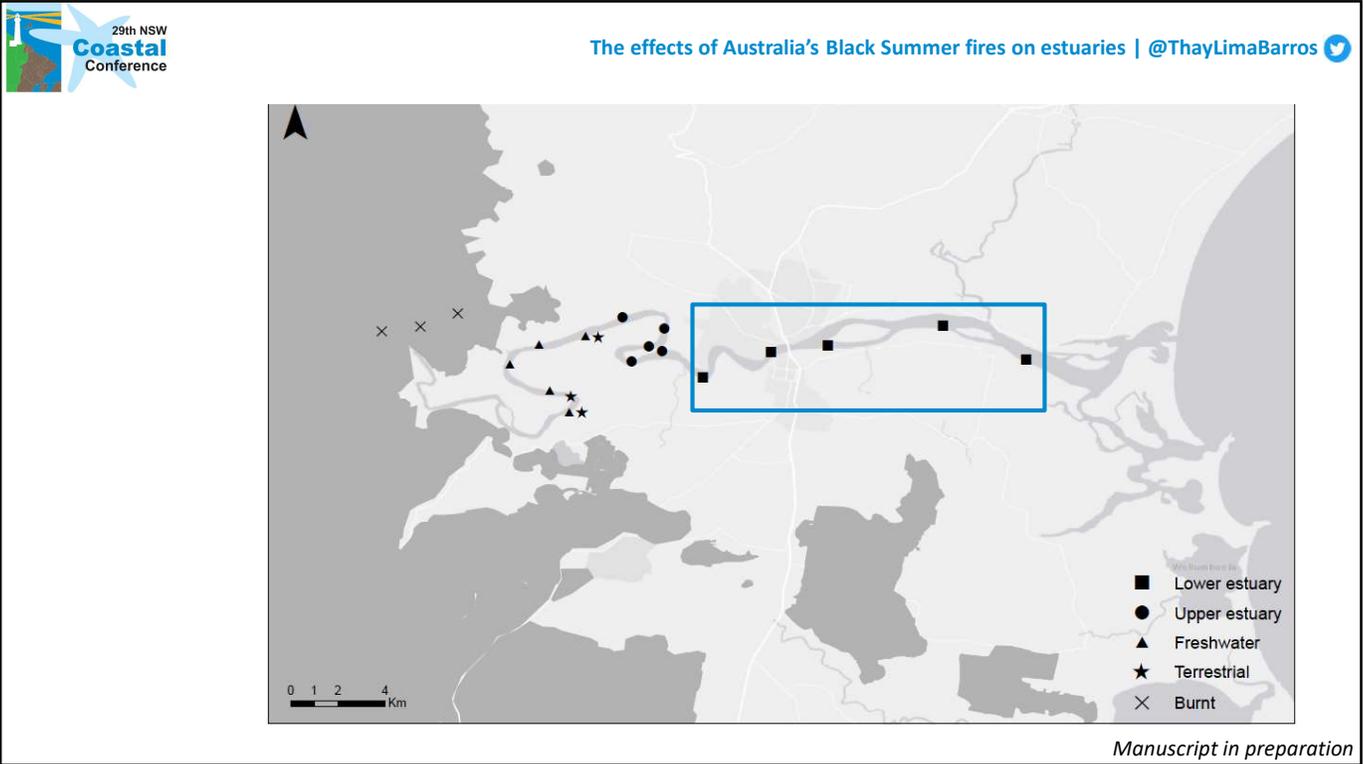
- clear separation
- shift was mainly driven by Py-C, TOC, TN, and a few metals

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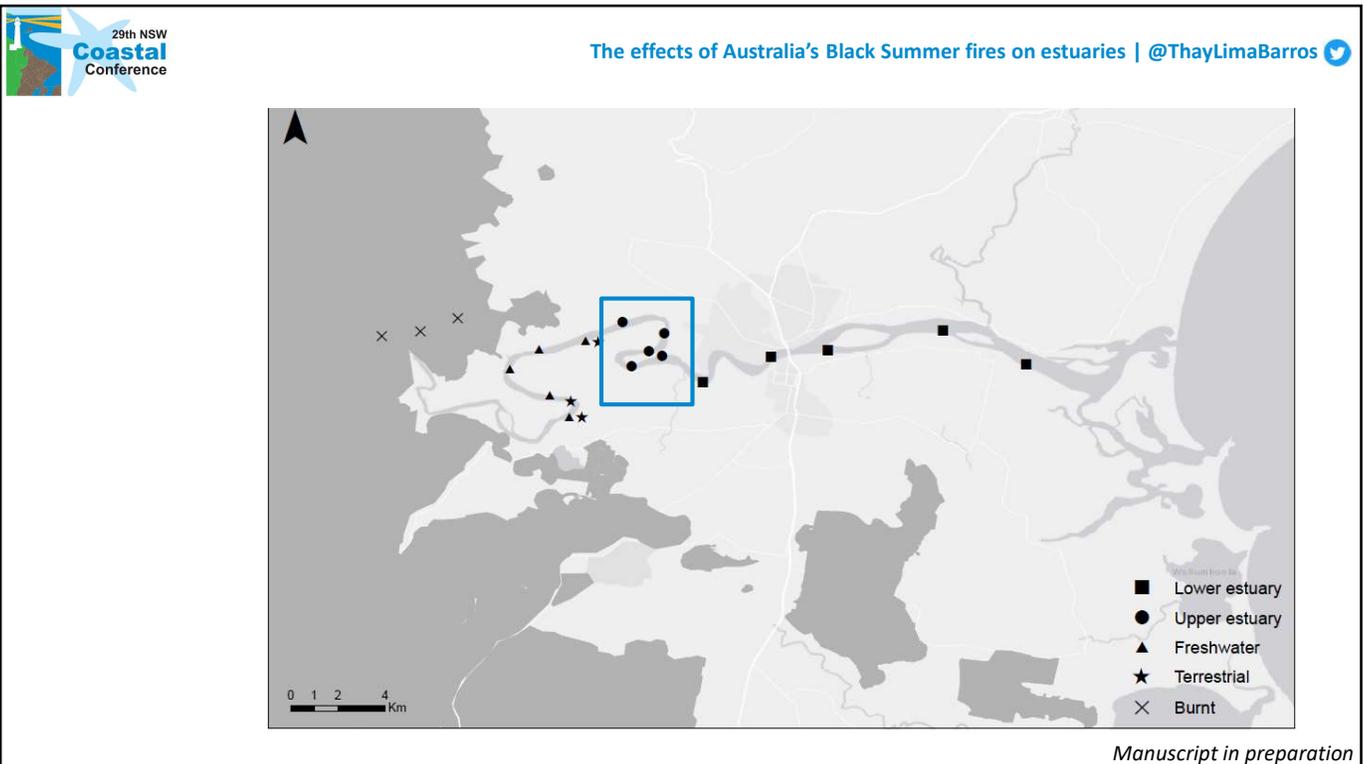


- clear separation
- shift was mainly driven by Py-C, TOC, TN, and a few metals
- Importance of riverine buffer zones to mitigate watershed impacts from bushfires

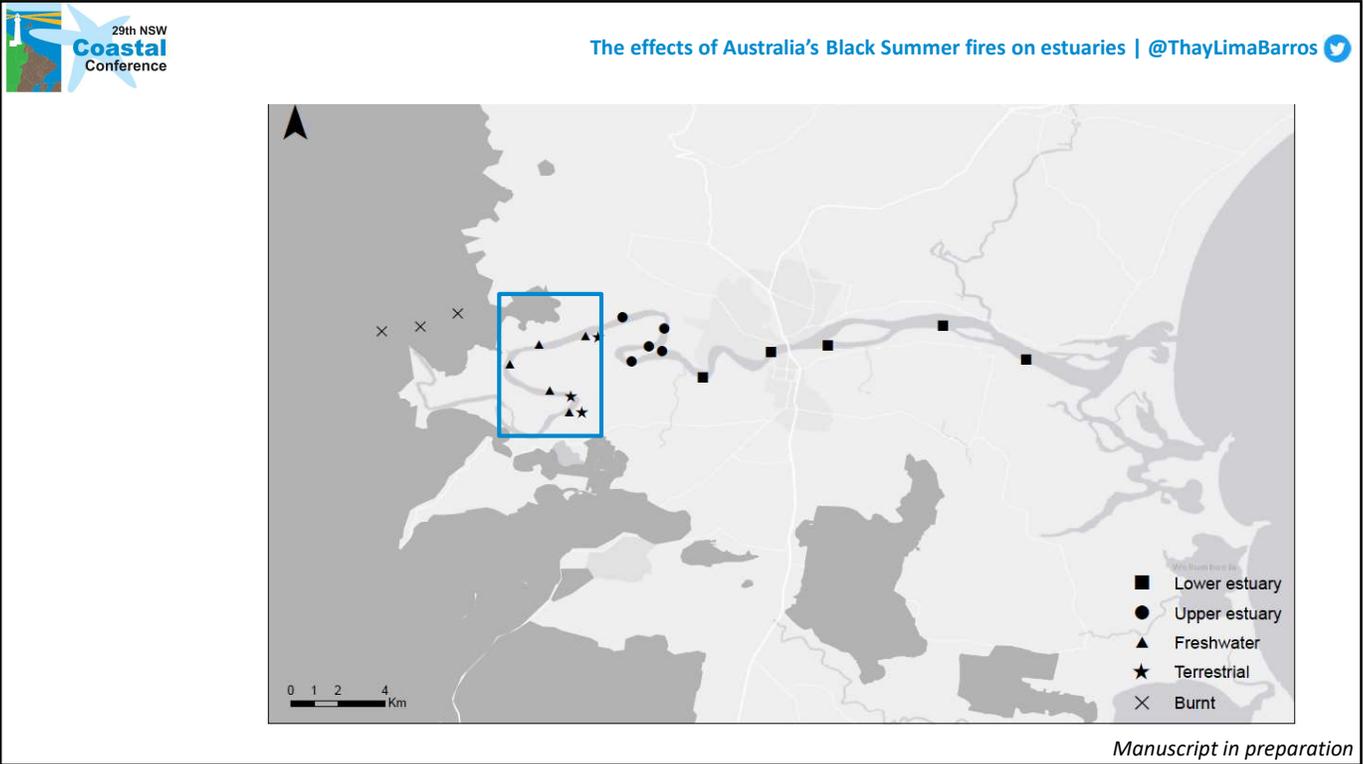
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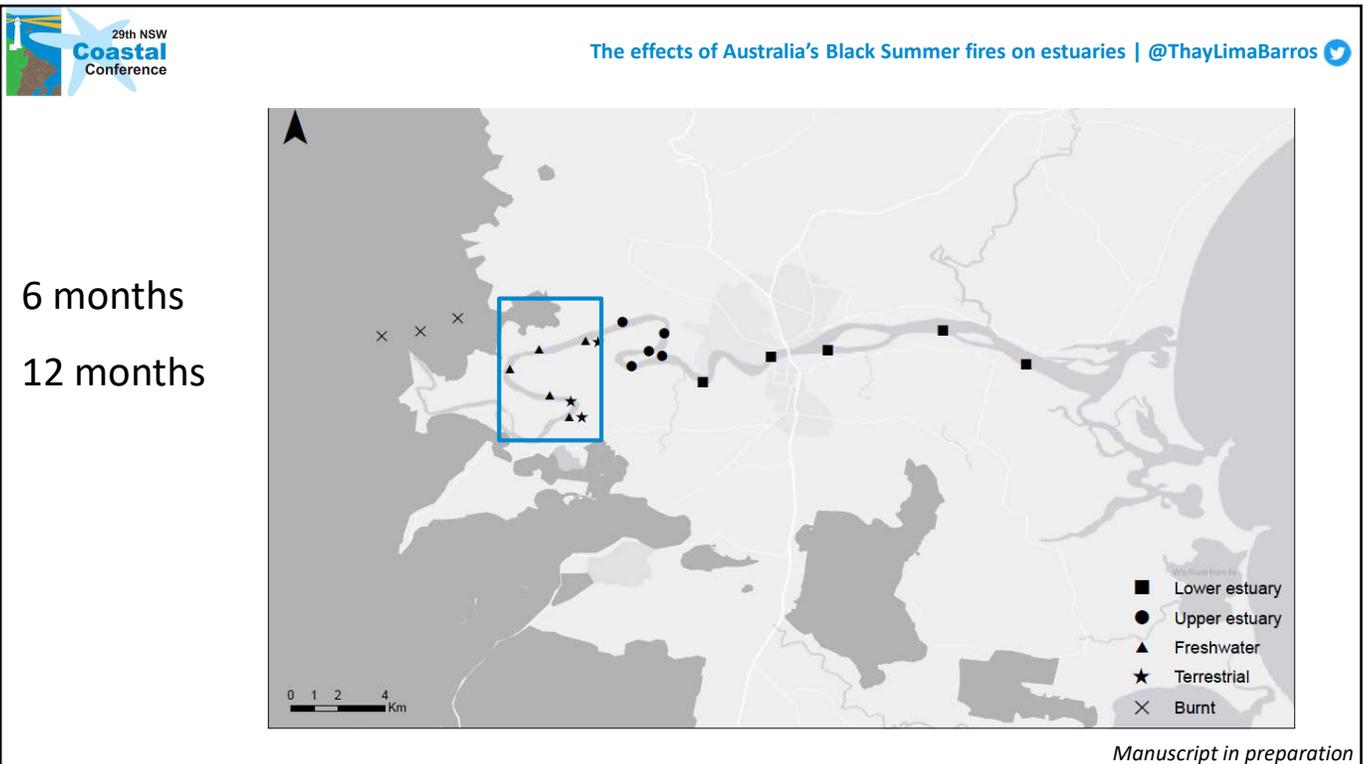
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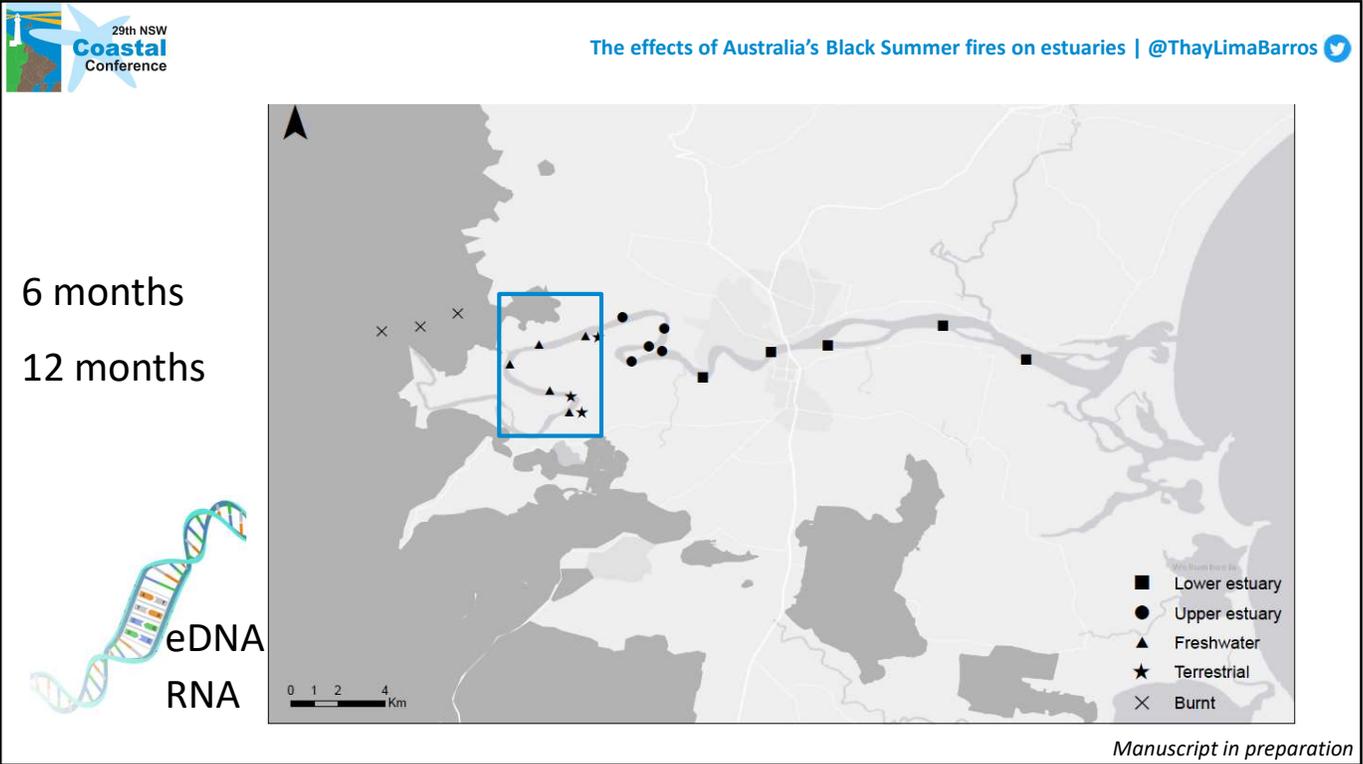
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- ✓ First characterisation of estuarine sediment quality changes following major bushfires
- ✓ Baseline for the development of environmental indicators of bushfire impact in these systems
- ✓ Identify relevant indicators of wildfire impact: metals, nutrients, and pyrogenic carbon
- ✓ Importance of riverine buffer zones to mitigate watershed impacts from bushfires

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Acknowledgement



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Acknowledgement





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